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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LEE, TIMOTHY L

ART UNIT

PAPER NUMBER

2697

DATE MAILED: 06/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/540,729

Applicant(s)

GURA ET AL.

Examiner

Timothy Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 March 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5.

- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

inputs, so in step 1 of Fig. 5, row b is chosen because it is only requesting to send data to output B and only to output B—the other three inputs are requesting to send data to more than one output. Thus, a relationship is formed where priority in assigning resources is inversely related to the number of requests that a particular input is making and can also be considered a requester priority (determining request priorities corresponding to requests for resources...each request priority being determined according to at least one of requester priority and resource priority, requester priority being inversely related to a number of requests made by a particular resource). After a particular input-output combination has been chosen, that row-column selection is then inhibited in further selections. See col. 6, lines 20-49. As mentioned already, at least the first combination in the example shown in Fig. 5 is chosen based on its request priority (allocating at least some of the resources according to request priorities). Calvignac et al. found that this particular algorithm to be particularly effective since the initial selection of the row with the fewest requests reduces the probability that the request selected within that row blocks the selection of other requests in the matrix. See col. 6, lines 63-67.

4. Regarding claim 2, as shown in Fig. 5, rows a, c, and d are requesting multiple resources.
5. Regarding claim 3, as shown in Fig. 5, columns A and D are being requested by multiple requesters.
6. Regarding claims 4, 5, 6, 14, 18, 20, and 28, Calvignac et al. discloses using a double round-robin approach to form the request and fairness matrices that are used in selecting the connections. See at least col. 5, lines 31-67. Calvignac et al. also mentions that any priority scheme used within the rearrangement matrix must ensure that each request has a high

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-7 and 11-29 are rejected under 35 U.S.C. 102(e) as being anticipated by Calvignac et al. (US 6,370,148).
3. Regarding claims 1, 13, 15, 16, 17, 19, 23, and 27, Calvignac et al. discloses a data communication system that includes an improved arbiter that handles bursty traffic with improved fairness. As shown in Fig. 1, there are a number of inputs (a, b, c, and d) and a number of outputs (A, B, C, and D) into and out of the crossbar switch fabric, where the inputs are connected to an arbiter—the crossbar switch fabric provides for various lines that the inputs can connect to the outputs, thus providing a host of resources that the various inputs can use to reach the outputs (sharing multiple resources among multiple requesters using an arbiter). The arbiter 110 is responsible for controlling the crossbar switch fabric via the control lines so as to repeatedly select the subset of input-output combinations which maximizes the utilization of the output ports, with the constraint inherent in a crossbar switch that at any time each input can only be connected with one output and each output can only be connected to one input. See col. 4, lines 32-38. Fig. 5 shows an example of how the connections are chosen. First, the row is chosen which has the lowest number of requests, where the rows correspond to the different

probability of being eventually selected, or in other words, to prevent starvation. See col. 6, lines 55-60.

7. Regarding claim 7, as mentioned previously, requester priority can be awarded to the requester that has the least number of requests.

8. Regarding claim 10, as mentioned previously, the requesters are the input ports that are requesting resources which are the outputs. The crossbar switch fabric allows multiple ones of the outputs to be accessible to more than one of the input ports.

9. Regarding claims 11, 21, 22, and 29, the input/output ports are considered data processing units, so the inputs could be considered processors while the outputs could be considered memories where the data from the processors will be stored—a memory could be considered a type of a data processing unit. Also, the transports mechanism shown in Fig. 1 is also called a crossbar switch matrix.

10. Regarding claim 12, the control logic algorithm in col. 6, lines 24-34 works recursively until the resources are allocated, so each time the algorithm starts over again, the priorities are recalculated.

11. Regarding claim 24, as mentioned previously, resources are allocated according to an inverse function where the requester with the least amount of requests gets top priority of its desired resource.

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 8, 9, 25, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Calvignac et al.. The rejection of claim 1 also stands in this rejection. Calvignac et al. does not expressly disclose assigning priority to each requested resource according resource priority, but it would have been obvious to a person of ordinary skill in the art to assign priority according to resource priority as opposed to requester priority. One would have been motivated to do this because it would have been just as easy to select the column with lowest number of requests and to run the control logic algorithm in the same manner as before, except with resource priority being the concern. The two techniques accomplish the same goal of maximizing the number in input/output connections.

14. Regarding claims 9 and 26, it would have been obvious to combine the two priority assigning techniques in order to assign a priority. One would have been motivated to do this because it could maximize the number of input/output connections.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Stewart (US 6,111,886), Bauman et al. (US 6,160,812), and Isoyama et al. (US 6,570,873) discloses systems that assign priority according to various criteria.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy Lee whose telephone number is (703)305-7349. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (703)305-4798. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703)872-9314 for regular communications and (703)872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)305-4700.

TLL
June 12, 2003


RICKY NGO
PRIMARY EXAMINER